At top—View of Worcester, from an old print. The battle was fought on the foreground meadows. In the centre, the flight of Charles before the Parliamentary Soldiers; designed from various contemporary portraits of Charles II., Harrison, Lilburne, Bradshaw, and others. At the bottom, the old wooden house, in the Corn-Market, Worcester, in which Charles lodged.

LOCAL MEMORIES OF GREAT EVENTS.

BATTLE OF WORCESTER.

The battle of Worcester, gained by Cromwell, September 3, 1651, is one of those points in English history from which may be conveniently taken a view both retrospective and prospective of a period of the very highest interest and importance. Looking to the events anterior to but connected with the Battle of Worcester, we find Charles I., who succeeded his father in 1625, attempting to govern without the aid of parliaments, and in 1634 he issued writs, directing the sheriffs of the different counties to collect from each of the inhabitants, according to their means, a sum of money for the equipment of ships for the king's service. This tax, known by the name of ship-money, was at first generally paid, though known to be illegal. John Hampden, a gentleman of fortune and good family in Buckinghamshire, an earnest lover of liberty and a true patriot, he alone brought the question before the courts of law. The judges were weak enough to assert that the king could, by his own royal authority, levy that or any other tax. The question was henceforth to be decided in the field. The royalists were beaten at Edge Hill, in 1642; at Marston Moor, in 1644; and lastly, at Naseby, in 1645. In England they never rallied in the field after the flight from Naseby: and in less than five years, namely, on the

30th of January, 1649, the king was beheaded at Whitehall.

Charles II. was residing at the Hague at the period of his father's execution. His friends in England were suffering under confiscations and imprisonment, and the royalist party, which had engaged with such high spirit in the cause of the late king, was broken and subdued. Many an antient family which had lived peacefully in the enjoyment of its broad possessions since the wars of the Roses, was now, as Clarendon states, glad to compound for one half of their estates by giving up the other half. The young king was, however, proclaimed in Scotland and in Ireland. In the latter country a rebellion was excited against the authority of the parliament, which was put down in the spring of 1650 by Cromwell. The state of parties in Scotland led to some important movements on behalf of the royal exile. They had proclaimed his accession as soon as his father's death was known, but it was not until June, 1650, that he landed in Scotland. An army was raised in Scotland, which prepared to march over the border. On the 3rd of September, Cromwell defeated the Scots army at Dunbar, and the king was forced to withdraw into the Highlands. Charles and his adherents again collected an army, and took up a strong position near Stirling, receiving supplies from the Highlands; but Cromwell laid siege to Perth, intending to prevent the Highlanders sending supplies either of men or provisions to Stirling. The king, with the advice of his council, now determined upon the bold step of marching into England, and this resolution was executed with so much secrecy and expedition, that Charles, who was previously so much nearer England, had marched a whole day without Cromwell being able to understand the nature of his movements. When he did see their object, it was difficult to determine the course to be pursued. "If he followed with his whole army, all the advantages he had got in Scotland would be presently lost. . . . If he followed but with part, he might be too weak when he overtook the king, whose army, he knew, would bear the fatigue of a long march better than his could do so."* His situation was a critical one, but his resolution was quickly taken. He despatched an express to the Parliament to prevent their being surprised with the news of Charles's advance; Lambert, the Parliamentary general, was immediately despatched with a body of horse, with directions to hang on the rear of the king's army and to disturb and harass it; and Monk being left with some troops to keep things quiet in Scotland, Cromwell began his own march three days after the king was gone.

Both armies advanced with the greatest rapidity. The king, on approaching Shrewsbury, summoned it to surrender, but this demand being firmly denied, the army marched towards Worcester, a city which had been well affected to the late king, and was one of the last to surrender to the Parliament. The principal gentry of the county were at the time prisoners in the city, but on the king's approach all those who were employed by the Parliament fled, and the gates of the city were opened to Charles by his friends, who were now restored to their liberty. Here the wants of the army were relieved, and good quarters provided for them after the fatigue of so long and harassing a march. Cromwell had proceeded by the nearest way towards London, and the two armies were about an equal distance from the capital. Clarendon thus speaks of the advantages of Worcester in that day as a military position:—"It was a very good post, seated almost in the middle of the kingdom, and in as fruitful a country as any part of it; a good city, served by the river of Severn from all the adjacent counties; Wales behind it, from whence levies might be made of great numbers of stout men: it was a place where the king's friends might repair, if they had the affections they pretended to have; and it was a place where he might defend himself, if the enemy would attack him, with many advantages, and could not be compelled to engage his army in a battle till Cromwell had got men enough to encompass him on all sides; and then the king might choose on which side to fight, since the enemy must be on both sides the river, and could not come suddenly to relieve each other, and the straitening the king to this degree would require much time, in which there might be an opportunity for several insurrections in the kingdom, if they were so weary of the present tyranny and so solicitous to be restored to the king's government as they were conceived to be: for nobody could ever hope for a more secure season to manifest their loyalty than when the king was in the heart of the kingdom, with a formed army of about fifteen thousand men, horse and foot (for so they might be accounted to be), with which he might relieve those who were in danger to be oppressed by a more powerful party. These considerations produced the resolution to provide in the best manner to expect Cromwell there; and a hope that he might be delayed by other diversions: and there was like to be time enough to cast up such works upon the hill before the town as might keep the enemy at a distance, and their own quarters from being suddenly straitened: all which were recommended to General Lesley to take care of, and to take such a perfect view of the ground that no advantage might be lost when the time required it."

Few or none of the English gentry rallied round the royal standard. There was at the same time little unanimity between the officers of the royal army; and news had been received of the defeat of the Earl of Derby, who had remained to recruit the king's forces in Cheshire and Lancashire. These reverses, and any other untoward circumstances, instead of rendering the royalist generals more united, and more urgent in establishing order amongst their troops quartered in the city and in raising the necessary works for its defence, seem rather to have paralysed them, so that little was done to improve the natural advantages of their position.

The king had been several days in Worcester when Cromwell was known to be within less than half a day's march. His army was increased by large reinforcements, particularly of cavalry and the militia of different counties. He did not trouble himself to besiege the place, but, as Clarendon says, "marched on directly as to a prey," and quickly made himself master of all the strong points which commanded the city, in which he met with very little opposition. On the 3rd of September he directed his troops to fall on in all places at once; the royalists were soon in confusion; the resistance which was attempted by some of them, however gallant, being totally ineffectual. They were in fact thoroughly defeated, and it was with the greatest difficulty that the king made his escape. The account of his concealment at Boscobel House, and some particulars relating to his adventures while he remained a fugitive in the kingdom, will be found in a former Number (522). He never visited England again until his Restoration.

The battle of Worcester, which Cromwell, in the language of that day, termed his "crowning mercy," was fought on the anniversary of his victory at Dunbar. From this period he advanced to the supreme power by overcoming the factions into which the anti-royalist party itself was divided. On the 20th of April, 1653, he dissolved the Long Parliament, and took the government into his own hands.

* Clarendon, book xiii., p. 535.

THE DISSEMINATION OF THE SEEDS OF PLANTS.

An early volume (the fourth) of Brande's 'Quarterly Journal of Science' contains an interesting article, by M. Mirbel, upon the modes in which the spontaneous dissemination of plants is accomplished: a few remarks upon this subject, taken from that paper, and from other sources, will probably prove interesting to our readers.

The beautiful processes going on within the floral envelope of a plant for the maturation of its seeds would often seem objectless, unless adequate means for their dispersion existed. That this is effected, the constant and regular re-appearance of the countless races of the vegetable world attest; but since spontaneous movements have been denied to plants, and man's immediate agency is but very limited, other causes of extensive operation must exist. Of these one of the most prominent is the wonderful fecundity of plants. Ray counted 32,000 seeds in the heads of one poppy-plant, and 360,000 on one tobacco-plant. Dodort mentions an elm which produced 529,000 seeds. Yet none of these vegetables are among the foremost in degree of fecundity. The number of seeds borne by a plant of Begonia or Vanilla, but above all by a fern, confounds calculation. But, as Linnæus observes, supposing any annual plant produced only two seeds yearly, even of this, after twenty years, there would be 1,048,576 individuals. The great longevity of many seeds tends to the same end, for although some descriptions soon spoil, and hence require to be sown as soon as ripe, the greater proportion will preserve the germinating faculty for years, and even for ages. Professor Lindley observes that this would seem chiefly to depend on the degree of protection the integuments of the seed afford it; for, as gardeners well know, it is impossible to preserve very delicate seeds with thin skins more than a few weeks or months, so, on the other hand, hard horny seeds will germinate after the lapse of a very long portion of time. "When land is cleared, or ancient ditches emptied, or earth broken up to a considerable depth, as in well-digging, it not unfrequently happens that plants spring from the mould, whose seeds must have been buried for many years or ages." Horne sowed with success barley that had been gathered a hundred and fifty years. Wheat has been discovered in subterraneous hoards, which had been lost and forgotten for time out of mind, in as perfect a state as the day it was reaped. Melon seeds have grown after forty-one years, Indian wheat after thirty years, rye after forty years, sensitive plants after sixty years, and kidney beans taken from Tournefort's Herbarium a hundred years after they were gathered.

Seeds thus abundantly produced and securely preserved are scattered abroad by various agencies, not only in this manner filling up voids which would otherwise exist, but also preventing that barrenness and impoverishment which occur when they are accumulated in great numbers within too narrow a compass. 1. The force of the air or wind is a principal one among such agencies, and several circumstances in the structure of plants favour its operation: thus they are elevated and as it were exposed to its action upon stalks, while the seed-capsules open usually at the apex. And as to the seeds themselves, many of them are almost as fine and as volatile as the pollen or dust of the anther itself, and thus no place can be closed to the access of the fungi producing mouldiness, transported by the winds. Heavier seeds are supported by wings, which also waft them along. The seed-vessel of the elm is surrounded by a circular membranous wing; that of the ash is terminated by one that is oblong. The seed-vessels of the maple have two large side-wings; those of the fir, the cedar, and the larch are furnished with a wing of great fineness. The seeds of syngeneseous plants are furnished with a feathery crown or aigrette, and look like small shuttlecocks. The separate threads that compose this aigrette distending as they dry, serve as levers to lift the seed from the involucre that holds it, and, when out, as a parachute to prevent it coming to the ground, and to buoy it in the air. A familiar and beautiful example presents itself in the seeds of the thistle and dandelion sailing along supported by their little tufts. Linnæus suspects that the Erigeron Canadense came through the air from America to Europe. The little cord which attaches the seeds of the dog's-bane, swallow-wort, periploca, &c. to their receptacles, and the calyx of several of the valerians and scabies, form elegant aigrettes. Seeds may be carried by eddies of wind very far from the spot where they originally grew. Whirlwinds have been known to scatter over the southern coast of Spain those that had ripened on the northern coasts of Africa.

2. The waters are another great means for the transportation of seeds. Those of them whose capsules are firmly closed may be carried immense distances by torrents and rivers, or by the sea itself. Cocoa-nuts, cashew-nuts, and the pods of the *mimosa scandens*, sometimes of the length of two yards, with many other fruits of the tropical regions, are cast upon the shores of Norway, in a state to vegetate did the climate permit. Regular currents transport the large double cocoa-nut of the Sechelles to the coast of Malabar, at the distance of four hundred leagues from whence it was produced. Fruits brought by the sea have sometimes discovered the existence of unknown lands to the windward. By such tokens Columbus, in the search for the American continent, was apprised that he was not far distant from the land of which he had prognosticated the existence. Linnæus has some interesting observations upon this subject. "In Lapland we see the most evident proofs how far rivers contribute to deposit the seeds of plants. I have seen Alpine plants growing on the shores frequently thirty-six miles distant from the Alps. . . . . The centaury is a German plant, whose seeds being carried by the wind into the sea, the waves landed this foreigner upon the coasts of Sweden. . . . . Many have imagined, but erroneously, that seed corrupts in water, and loses its principle of vegetation. Water at the bottom of the sea is seldom warm enough to destroy seeds; we have seen water cover the surface of a field for a whole winter, while the seed which it contained remained unhurt, unless at the beginning of spring the waters were let down so low by drains that the warmth of the sun-beams reached to the bottom; then the seeds germinated, but presently became putrescent; so that for the rest of the year the earth remains naked and barren. Rain and showers carry seeds into the cracks of the earth; streams and rivers, which last, conveying them to a distance from their native places, plant them in a foreign soil."

3. Animals co-operate in an extensive degree in the dispersion of the seeds of plants. The squirrel and cross-bill are both very fond of the seed of the fir; to open the scales of the cones, they strike them against stones, and thus set free and disperse the seed. Birds swallow the berries, of which they digest only the pulp, but void the stones entire and ready to germinate. It is thus that the thrush and other birds deposit the seed of the misletoe on the trees where it is found; and indeed, destitute as this is of wings or aigrettes, it could not be disseminated in any other way, for it will not grow on the ground. The pocan or poke of Virginia (Phytolacca decandra), which was introduced by

the monks of Corbonnieux into the neighbourhood of Bordeaux, for the sake of colouring the wine, has been since disseminated by the birds throughout the southern departments of France and in the deepest valleys of the Pyrenees. The Dutch, with the view of monopolising the trade of nutmegs, extirpated the trees on those islands which they could not watch so narrowly as the rest; but in a short time these very islands were re-stocked with nutmeg-trees by the birds, as if nature refused to admit of such an encroachment on her rights. Granivorous quadrupeds disseminate the seeds they do not digest. The newly manuring a field will cause innumerable weeds to spring up, which did not exist there before. The hoards of fruits or seeds (for fruits are but the envelopes of seeds) which various animals make, such as crows, rats, dormice, &c., are frequently forgotten, or, by the destruction of the animal, neglected and lying dormant where they were placed during the winter, germinate in the spring. The fruit of the prickly-seeded scorpion-grass, of clovers or goose-grass, of the wood-sanicle, are all provided with small hooks by which they lay hold of the fleeces of sheep, cattle, &c., and are thus carried with them. Linnæus enumerates no less than fifty genera armed in this way.

There are particular plants, such as the pellitory of the wall, the nettle, and the sorrel, that may be said to seek the society of man, and actually to haunt his footsteps. They spring up along the wall of the village, and even in the streets of the city; they follow the shepherd, and climb the loftiest mountain with him. "When young," says M. Mirbel, "I accompanied M. Ramond in his excursions in the Pyrenees, where that learned naturalist more than once pointed out to me these deserters from the plains below; they grew on the remains of ruined hovels, where they kept their station in spite of the severity of the winters, and remained as memorials to attest the former presence of man and his flocks."

4. Seeds often assist as it were in their own dispersion. In the balsam, the catchfly, fraxinella, sandbox-tree, &c., the valves of the seed-vessels open with a spring that projects the contents to a distance from the parent plant. The gourd of the squirting cucumber, by a contraction which takes place at the moment of its fall, darts out the seed along with a corrosive fluid by a vent formed as it quits the stalk. The pouch which contains the seed of the wood-sorrel, on the termination of its growth, bursts, and shoots out the seeds by an elastic movement. Among the mushroom tribes, some of the species of peziza impart a vibratory motion to the cap or cover which bears their seed when that is ripe. Puff-balls burst at the top like the crater of a volcano; and the seed is in such quantity, and so fine, that when it escapes it has the appearance of a volume of smoke. The capsules of ferns, contracted while ripening, open with a spring. A like cause gives motion to the cilia or inner fringe which surrounds the urns or seed-vessels of mosses. Linnæus enumerates fifty genera whose seeds are dispersed by some of the means to which we have just alluded. He also mentions another very remarkable mode in which they sometimes assist their projection. "The crupina, a species of centaury, has its seeds covered with erect bristles, by whose assistance it creeps and moves about in such a manner, that it is by no means to be kept in the hand. If the bearded-oat after harvest be left with other grains in the barn, it extricates itself from the glume. Hence the Dalecarlian, after he has cut and carried it into the barn, in a few days finds all the glumes empty, and the oats separate from them; the spiral arista or beard of the oat is contracted in wet and extended in dry weather; when it is contracted, it drags the oat along with it, for as this is bearded with minute hairs pointing downward, the grain necessarily follows it. The seeds of the equisetum or fern, viewed upon paper through a microscope, seem to be endowed with a description of leaping movement."

Distances, chains of mountains, rivers, the sea itself, are unavailing barriers to the migration of seed. Climate alone can set bounds to the dispersion of the vegetable races. In process of time it is probable that most of the plants which grow within the same parallel of latitude will be common to all the countries comprised in the entire zone of it; an event which would be one of the great blessings resulting from the industry and persevering intercourse of civilised nations. But no human power will ever force the vegetable of the tropics to endure the climate of the poles, nor *vice versâ*. Here nature is too strong for man. Species cannot spontaneously spread themselves from one pole to the other, the intermediate differences of temperature preventing such progress; but we may assist in transporting them, as we have done successfully in various instances. We have already transplanted the eucalypti, the metrosidera, the mimosas, the casuarinæ, and other plants of Australia into our own soil, while the gardens of Botany Bay are stocked with the fruit-trees of Europe. A similar mutual interchange of the vegetable productions always promotes the progress of that civilization of which it is one of the effects.

M. Mirbel concludes his paper with the following passage:—

"The dissemination of seeds completes the round of vegetation. The shrub and the tree are bared of their foliage: the herb is dried up, and returns to the earth from which it came. That earth appears to us as if stripped for ever of her gay attire, yet countless germs await but the stated season to re-adorn her with verdure and bloom. Such is the prodigal fertility of nature, that a surface a thousand times the extent of that of our whole globe would not suffice for the seed-harvest of a single year, provided the whole was suffered to re-appear; but the destruction of seed is endless, and only a small portion escapes to rise again. In no way in our view are the power of nature and the immutability of its laws more strikingly displayed than in the successive resurrections of the types of bygone genetions."

Beauty of Shells.—We admit that shells are beautiful, and that they are admirably adapted to the exigences of the wearers; but how shall we account for the endless diversity of shades and colours, varying from the sober coating of the garden snail, to the delicate and glowing tints which are diffused over some of the finer species, in the infinite profusion of undulations, clouds and spots, bands and reticulated figures, with which these admirable architects enrich the walls of their beautiful receptacles. The means of producing them must be sought for in the animals themselves. Their necks are furnished with pores replete with colouring fluid, which blends insensibly with the calcareous exudation already noticed, and thus occasions that exquisite variety in their testaceous coverings, which art attempts to emulate, but can never fully equal. Thus far is the result of observation and experiment. It now remains to account for the extraordinary fact that the stony exudations of testaceous animals condense only on those parts where they are essential to their welfare. But here investigation ends—the microscope has done its office. It seems as if maternal nature delighted to baffle the wisdom of her sons, and to say to the proud assertors of the sufficiency of human reason for comprehending the mysteries of creation and of Providence, "Thus far can you go, and no farther; even in the formation of a shell, or its insignificant inhabitant, your arrogant pretensions are completely humbled."—*The Conchologist's Companion, by Mary Roberts.*

a, Wild Boar; *b*, old unimproved breed; *c*, black or wire-haired breed; *d*, Boar of the improved breed; *e*, sow and young of improved breed; *f*, Suffolk breed; *g*, Chinese breed.]

THE HOG.

As is the case with all our domesticated animals, the hog has undergone various modifications of size and contour, and has diverged into different breeds (the consequence of judicious selections by the breeder, and of different modes of feeding).

It cannot be doubted that the wild hog, once common in our island, and still abundant in many districts of continental Europe and Asia, is the origin of our domestic race, at least if we except the Chinese breed, which some naturalists, and among them Fred. Cuvier, consider to be derived from a distinct stock.

The wild hog, when fully grown, is a formidable animal; and its strength and ferocity render it more than a match for the strongest dog in single combat. The savage nature of the wild race is by no means extinct in the domestic breed: we have seen boars and aged sows which it was dangerous to approach, and we have known instances in which they have attacked and wounded even the persons who attended to them. In the New Forest, where troops of semi-domesticated hogs, closely approaching the wild race in form, wander at large, these animals display great activity and spirit; they resolutely defend themselves against dogs, and when excited are even ready to rush upon any person who ventures too near them. The dog seems to rouse the anger of the hog more than any animal; and this more particularly when the hog is only semi-domesticated, as in the New Forest or in the woods of Sweden. Mr. Lloyd, in his 'Field Sports,' particularly alludes to this circumstance, and

describes the fierceness and resolution of the Swedish hogs, which, whenever they caught sight of his dogs, rushed upon them; and on one occasion, when he with some difficulty saved a brace of pointers from an infuriated sow, he was himself placed in great jeopardy; she resolutely attacked him, nothing daunted by several wounds received from a spear which it was necessary to employ in self-protection.

The importance of the domestic hog in an economic point of view is appreciated by all. In the rearing and feeding of this animal, and in the preparation of its flesh and fat by the processes of salting and drying, capital to a considerable amount is involved. Its flesh is also used in a fresh state; and most agree that young pig is one of the delicacies of the table. It was esteemed as such by the epicures of ancient Rome.

"Much of the value of the hog," says the writer of the third volume of 'Menageries,' "results from the constitutional predisposition of its race to the deposition of a layer of unctuous fat between the skin and muscles, which fat is termed lard, in contradistinction to suet or to oil, and to the readiness with which that unctuous fat becomes impregnated with saline particles. In this respect indeed it differs materially from suet, whether of the ox or sheep, and also in the proportions of its chemical constituents. In 100 parts of hog's lard there are 38 parts of stearin, and 62 of elain. In the fat of the sheep the stearin is in much greater proportion, as it is also in the suet of beef, of which three-fourths consist of stearin: hence the suet of the sheep and ox is well adapted for various domestic purposes, and among them the manufacture of candles, for which the lard of the hog is useless."

Our Saxon forefathers fully appreciated the value of the hog; its flesh was, in fact, the staple food of every household, and the wealthy possessed large herds, which, under the care of thralls, or villains, were driven into the woods, there to feed on acorns or mast, as is the case at present in Portugal. The right of pasturage for hogs was claimed under certain conditions, and might be conveyed by deed. In an ancient Saxon document we read, "I give food for 70 swine in that woody allotment which the countrymen call Wolferdenlegh." In the Saxon times, it is probable that the domestic, or rather, semi-domestic hog, closely resembled, both in aspect and habits, the wild race, then a native of our forests; as was the wolf also, against which the boar and the sow would have to defend themselves and their litter. They were a large and powerful breed, to which the hogs in the New Forest in the present day make the nearest approach. After the Norman conquest, the hog was comparatively neglected. The lands which the Saxons had won by the sword were now seized by the Normans, who, accustomed to a higher state of refinement than that existing among the Anglo-Saxons, despised their gross fare and the hogsflesh which they so largely used. Hence the numbers kept would diminish, and the breed would deteriorate from want of care and attention. The old unimproved hog, with a long lank body and large pendant ears, till lately common in England, and still more lately in Ireland, may be regarded as the degenerate descendant of the race neglected after the Norman conquest. The Normans despised agricultural labours as a pursuit; and the nobles and barons divided their time between war, hunting, and hawking. They expended but little capital on improvements in farming, against which indeed, had they ever so sedulously attempted them, foreign wars and the crusades, as well as continued international contests between rivals for the throne, would have militated. Had the knowledge been possessed, the power of carrying it into operation would have been wanting. The amalgamation of the jarring elements of the body politic, and the subsequently rapid elevation of England in a commercial point of view, gave to the land a value before unknown, and stimulated its holders to every kind of improvement, whether connected with agriculture or the rearing of live-stock. Since the time of Elizabeth, our races of sheep, cattle, horses, and even swine have become modified, and various breeds have been established, the results of judicious selection and care in rearing. The old unimproved breed of swine is now seldom or never seen. On the contrary, we find that various counties have their own peculiar but at the same time highly improved race; some remarkable for the delicacy and excellence of their flesh, some for their size and contour, and the readiness with which they may be reared and fattened.

Hampshire and Berkshire are each celebrated for a fine breed, individuals of which often attain to extraordinary dimensions. One of the Berkshire breed which was killed at Congleton, Cheshire, is reported by Mr. Culley to have measured, from the nose to the end of the tail, three yards eight inches, and to have stood four feet and a half in height: its weight, when killed, was 86 stones 11 pounds avoirdupoise.* Size, however, is of minor importance; and since the introduction of the Chinese race, which has tended to the improvement of our native breeds, we less frequently hear of instances of enormous magnitude than formerly.

The Chinese hog is of small size, with a deep round body, full round haunches, a short thick neck, erect ears, and a short and abruptly sharpened snout. The limbs are short, with small bones and compact toes; the prevailing colour is black, or half black and half white. The flesh is remarkable for its delicacy. This breed, or one closely related to it, extends from China throughout the various groups of islands in the South Pacific.

Excellent as the flesh of the Chinese hog is, and of the breeds crossed with it, preference is given to some of our native improved breeds, as yielding the best bacon and hams. Of these the Berkshire, Hampshire, Suffolk, and Yorkshire breeds are highly esteemed.

The Irish hog remained till lately very much neglected, and was a thin, long-bodied, flap-eared animal. Of late years, however, owing to judicious crossing with our improved breeds, it has become greatly modified for the better, in the form, the quality of the flesh, and the facility with which it is fattened.

In the Orkneys and Hebrides a small stunted breed of pigs exists: the animals are left to themselves, and wander about the hills in search of a precarious subsistence. Occasionally they commit extensive depredations upon corn-lands and cultivated patches. These pigs are clothed with long bristles, which are used in the making of the ropes with which the fowlers are let down over the precipices of the rocks in quest of the young and eggs of the various sea-birds which make those giddy steeps their breeding-place. The flesh of these small hogs is generally lean and ill-flavoured, but it is said that if the animals were properly managed, it would be excellent, and make good bacon.

Much has been said respecting the advantages and disadvantages of keeping and rearing pigs: that the cottager whose garden produces sufficient refuse vegetable matter for the keep of one or two of these animals, with the exception of what is requisite for fattening, will derive profit from them, we cannot doubt. Nevertheless, it is greatly doubted by many competent judges whether swine form a profitable stock when fed on food which requires to be raised for the purpose; it is in connection with dairies, breweries, distilleries, and other large establishments, where offal food is abundant, that their importance is palpable; for they

* The old stone of 14lbs. is here meant, the weight being 1215lbs.

return, for the offal which they consume, and which would otherwise be wasted, a clear and considerable profit. In short, local circumstances must in a great measure determine the advantages or disadvantages attending the breeding and feeding of swine; and it is impossible either to lay down rules of general application or to describe a practice which necessarily varies in almost every district.

The sow carries her young for sixteen weeks; the pigs are usually weaned when about six or eight weeks old, and a couple of litters are generally produced each year: sometimes, indeed, five litters are produced within two years; but this is a rare occurrence. The following particulars should be attended to in the breeding of swine, namely, that the sow should not produce her litter in winter, as the young are delicate, and do not thrive during the cold weather; and also that the same should not occur when food is scarce, as is the case for the most part on corn-farms during summer. The months of February and August have been recommended as the most proper. The sow brings forth at each time from nine to twelve, or even fifteen young; hence, as Buffon observes, the sow forms an exception to two of the general rules of nature, that the largest animals are the least prolific, and that digitated quadrupeds produce the most numerous young. No other pachydermatous animal (as the elephant, rhinoceros, tapir, &c.) produces more than one, or at most two, at a birth. According to Azara, the peccary produces two at a birth, and only once a year. It is, however, probable that the hyrax, which in many respects resembles a rabbit, may also be an exception.

For the purpose of comparison, a figure of the wild boar, of the old unimproved breed of England, of the improved breed (a boar, sow, and young), of the black breed, of the Suffolk, and of the Chinese breeds, are given in the cut at the head of this article.

THE THERMOMETER.

[Concluded from page 232.]

From that time experiments in great abundance were made to ascertain what was the best liquid to employ, and what was the most convenient scale by which one temperature could be compared with another. Some used spirit of wine coloured with cochineal; some proposed linseed oil; others water; but the body which, all things considered, has proved most fitted for this purpose is mercury, the only metal which remains liquid at ordinary temperatures. Mercury enlarges in bulk more equably for equal increments of heat than most other bodies; it is more easily freed from air than either oil or alcohol, a quality of much importance in the construction of thermometers; it has a very convenient range, for while oil becomes viscid and tenacious at low temperatures, and alcohol boils before we can attain a high temperature, mercury retains its liquidity throughout a wide extent of change; and lastly, it accommodates itself to the temperature of surrounding bodies more readily than most other liquids. All these qualities pointed out mercury as the liquid best fitted for thermometers; and by the exertions of Réaumur and Fahrenheit, the construction of these instruments was brought to a point of much excellence. Fahrenheit, in order to make his instrument useful as a measurer, divided the stem, by marks on an attached frame, into a number of equal parts. He immersed the bulb containing the mercury in a mixture of snow and salt, which he erroneously thought would produce the most intense cold possible; then made a mark to indicate the height to which the mercury sank in the stem; then immersed the instrument in boiling water, and made a similar mark higher up. These two heights he made the limits of a scale, by dividing the difference between them into two hundred and twelve equal parts, called degrees (of which the symbol is °), making the lowest, or *zero*, =0°, and the highest = 212°. He afterwards found that when the bulb was immersed in melting snow or ice, the mercury remained at the level marked 32°; and from this circumstance we have been and still are accustomed to say that 32° is the freezing-point of water, for the thermometer gives the same indication when water is freezing as when ice or snow is melting.

When subsequent experiments showed that a much lower temperature than Fahrenheit's zero can be produced, it was necessary to have other degrees to indicate it, and these are preceded by the subtractive sign −. The thermometer of Réaumur, and that called the Centigrade, were afterwards constructed, differing from Fahrenheit's chiefly in the gradation of the scale. In Réaumur's the freezing-point is marked 0°, and the boiling-point 80°; in the Centigrade the freezing-point is 0°, and the boiling-point 100; so that two and one-fourth of Réaumur, or one and four-fifths of the Centigrade, are equal to 1° Fahrenheit. Fahrenheit's scale is used in England, the Centigrade in France, and Réaumur's in some other parts of Europe. In reading French books wherein temperatures are mentioned, the scale employed is that of the Centigrade thermometer; and the corresponding degrees of Fahrenheit may be deduced therefrom by remembering that 0° of Centigrade is the same temperature as 32° Fahrenheit, and that a degree of Fahrenheit is equal to five-ninths of a degree of the Centigrade. To convert a Centigrade indication to one of Fahrenheit, therefore, we multiply by 9, divide by 5, and add 32°. To perform the reverse operation, we subtract 32°, multiply by 5, and divide by 9. If Réaumur's thermometric indications are to be reduced to those of Fahrenheit: as 0° Réaumur is equal to 32° Fahrenheit, and as one degree of Fahrenheit equals four-ninths of a degree of Réaumur, we multiply by 9, divide by 4, and add 32°; and for the reverse operation, we subtract 32°, multiply by 4, and divide by 9 It will thus be found that—

41°	Fahr.	equals	4°	Réau. or	5° Cent.
50°	„		8°	„	10° „
59°	„		12°	„	15° „
68°	„		16°	„	20° „

Confining ourselves to Fahrenheit's thermometer, then, we find that it is simply a glass bulb and tube containing mercury to a certain height, which mercury, by the existence of a vacuum above it, is free to obey the expansive tendency which heat imparts to it; and by drawing marks on the wooden stem to which the tube is attached, to indicate the height to which the mercury rises when exposed to certain well-known heats, the instrument becomes a heat-measurer for future use.

The precautions necessary to be observed in constructing a thermometer we shall not enter upon, for they constitute a delicate branch of instrument-making.

When a thermometer is placed in the open air, the mercury speedily attains the same temperature as the air, in obedience to the law which regulates the diffusion of heat. The heat affects the mercury through the glass passing to or from it, according as the mercury is colder or warmer than the air when first exposed to it. As to the actual *quantity* of heat which a given bulk of mercury contains, we are totally ignorant of it; all we know being that different substances have different capacities for heat, some requiring more heat than others to bring them to a given temperature.

Thus, if the quantity of heat necessary to raise pure water through 1° of temperature be expressed by 1000, then 33 will express the quantity necessary to

raise the temperature of mercury one degree; or, in other words, mercury expands thirty times more readily than water, when placed in similar circumstances, and is thus a much more convenient liquid for thermometers than water.

Some thermometers have been constructed so that they may leave a record of the highest and the lowest temperatures which have occurred during a period when the observer could not attend the instrument. A double thermometer, of mercury and of alcohol, is provided with little bits of enamel or of steel, in such a manner that these shall remain stationary at the two extreme points of temperature which may have occurred during the absence of the observer. Rutherford, Six, Forbes, and others have constructed these register-thermometers of various forms.

For all temperatures between the freezing and the boiling points of mercury (−39° and +662°), a mercurial thermometer is that which is most conveniently employed; but for lower temperatures the thermometric liquid is generally alcohol, which has never yet been known to freeze. On the other hand, for very high temperatures, the expansion of solid bodies, instead of liquids, is made the means of measuring temperatures, as every fluid would go off into vapour. Such instruments are called pyrometers (fire-measurers), in which the expansion of a rod of metal at high temperatures is very accurately measured.

It will be readily understood that the object of using a thermometer in meteorological observation is not to determine the actual amount of heat in the air, but only the changes in the amount. Tables are given in various works, indicating the average temperatures in different countries,—at noon, at night, in summer, in winter, in sunshine, in shade, &c. But all these are merely intended as means of comparison with other indications obtained elsewhere, or at other times, with a view of deducing, if possible, some laws which will explain the true part which heat performs in the production of atmospherical phenomena. All the tables of temperature kept by the Royal Society and other scientific bodies; all the directions on this point given to Sir James Ross and other scientific travellers; all the thermometric averages given in our best almanacs, generally for the city or town where they are published, are intended as comparative data, from whence future truths may perhaps be gleaned as to the diffusion of heat in the atmosphere, but not as indications of the actual amount of heat present therein. In this point of view the term "thermometer" is somewhat unfortunate, for we cannot, correctly speaking, measure the heat in a body; we can only measure the effect which it produces in altering the dimensions of the containing body.

The Cross-Timber District in Texas.—The Cross Timber is a continuous series of forests, extending from the woody region at the sources of the Trinity, in a direct line north, across the apparently interminable prairies of northern Texas and the Ozark territory, to the southern bank of the Arkansas river. This belt of timber varies in width from five to fifty miles. Between the Trinity and Red River it is generally from five to nine miles wide, and is so remarkably straight and regular, that it appears to be a work of art. When viewed from the adjoining prairies on the east or west, it appears in the distance like an immense wall of woods, stretching from south to north in a straight line, the extremities of which are lost in the horizon. There appears to be no peculiarity in the surface of the ground over which the Cross Timber passes, to distinguish it from the surface of the adjoining country; but, where the country is level, the region traversed by the Cross Timber is level; where it is undulating, and where it is hilly, that also is uneven, conforming in every respect to the general features of the adjoining country. The trees composing these forests are not distinguishable by any peculiarity from those which are occasionally found in the adjoining prairies, or in the bottoms bordering the streams which intersect the Cross Timber. Oak, hickory, elm, white oak, post oak, holly, and other trees are found in it. The elm is often found growing luxuriantly far from any stream, and in apparently poor and sandy soil. The black jack, a species of oak, is met with throughout its whole extent, from the Arkansas to the "Black Jack ridge" at the sources of the Trinity. The Cross Timber, in its general direction, does not perceptibly vary from the true meridian. Dr. Irion (formerly secretary of state of the republic), a few years since accompanied a party of surveyors, who measured a line extending forty miles due south from the bank of Red River, near the Cross Timber, and found, to their surprise, that the western border of the Cross Timber continued parallel with this line through the whole distance. As might naturally be supposed, the Cross Timber forms the great landmark of the western prairies; and the Indians and hunters, when describing their routes across the country, in their various expeditions, refer to the Cross Timber as the navigators of Europe refer to the meridian of Greenwich. If they wish to furnish a sketch of the route taken in any expedition, they first draw a line representing the Cross Timber, and another representing the route taken, intersecting the former. Thus a simple but correct map of the portion of country traversed in the expedition is at once presented to view.—*Kennedy's Texas.*

Metropolitan Vehicles.—It is very difficult to conceive a London without an omnibus or a cabriolet. Yet who amongst us does not remember the hour when they first appeared. For some two hundred years, those who rode in hired carriages had seen the hackney-coach passing through all phases of dirt and discomfort; the springs growing weaker, the 'iron ladder' by which we ascended into its rickety capaciousness more steep and more fragile, the straw litter filthier, the cushions more redolent of dismal smells, the glasses less air-tight. But it is of little consequence. Nobody rides in them. The gentlemen at the "office for granting licences for carriages plying for hire in the metropolis" tell us that licences are still granted to four hundred hackney-coaches. Alas, how are the horses fed? Are the drivers living men who eat beef and drink beer? We doubt if those huge capes ever descend to receive a fare. Are they not spectre-coaches—coachmen still doomed to sleep upon their boxes, as the wild huntsman was doomed to a demon-chase—for propitiation? The same authority tells us that there are fifteen hundred cabriolets to whom licences are granted. These we know are things of life. They rush about the streets as rapid as fire-flies. They lame few, they kill fewer. They sometimes overturn us; but their serious damage is not much. We borrowed them from the French on a fine May morning in the year 1820. It is remarkable how slow we are in the adoption of a new thing; and how we hold to it when it is once adopted. In 1813 there were eleven hundred and fifty cabriolets upon the hackney-stands in Paris—"Cabriolets de place,"—and we had not one. Now, we have fifteen hundred of them.—*London, No. 2.*

The Fate of Velleia.—In 1760 an exceedingly curious discovery was made close to the base of the Apennines, between Parma and Piacenza. At a village called Macinesso, overshadowed by steep hills, the finding of a few antiques tempted the Duke of Parma to excavate; and, at a depth of many feet, covered by successive layers of soil and rocks, were disinterred the remains of an extensive town, to which its inscriptions gave the name of Velleia. It had perished by a landslip, supposed to have occurred in the fourth century; and the number of skeletons that lay among the ruins showed that the catastrophe, which piled the first strata above the unhappy town, had been sudden and fatal. But the ancient writers are alike silent on the history of Velleia and on its fate: its antiquities also are mere fragments; and these causes, joined to the remoteness of the place from the great roads, have been the excuse of travellers for generally neglecting it.—*Edinburgh Cabinet Library, No. XXIX.: Italy and the Italian Islands, Vol. I.*

Mutual Support.—The race of mankind would perish, did they cease to aid each other. From the time that the mother binds the child's head, till the moment that some kind assistant wipes the death-damp from the brow of the dying, we cannot exist without mutual help. All, therefore, that need aid have a right to ask it of their fellow-mortals: no one who holds the power of granting can refuse it without guilt.—*Sir Walter Scott.*